

DNA, DNA Replication and Mitosis Practice Test

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- ___ 1. After cell division, each daughter cell has
- a lower surface area/volume ratio than the parent cell.
 - a higher surface area/volume ratio than the parent cell.
 - more DNA in its nucleus than the parent cell.
 - less DNA in its nucleus than the parent cell.
- ___ 2. The process by which a cell divides into two daughter cells is called
- cell division.
 - metaphase.
 - interphase.
 - mitosis.
- ___ 3. An advantage of sexual reproduction over asexual reproduction is that sexual reproduction
- takes less time
 - requires more time
 - provides genetic diversity
 - produces identical offspring
- ___ 4. Which of the following lists structures from smallest to largest?
- chromosome, supercoil, coil, nucleosome, double helix
 - chromosome, coil, double helix, nucleosome, supercoil
 - double helix, nucleosome, coil, supercoil, chromosome
 - nucleosome, coil, double helix, chromosome, supercoil
- ___ 5. When during the cell cycle are chromosomes visible?
- only during interphase
 - only when they are being replicated
 - only during cell division
 - only during the G₁ phase
- ___ 6. During which phase in the cell cycle does mitosis happen?
- G₁ phase
 - G₂ phase
 - M phase
 - S phase
- ___ 7. Which pair includes a phase of the cell cycle and a cellular process that occurs during that phase?
- G₁ phase, DNA replication
 - G₂ phase, preparation for mitosis
 - S phase, cell division
 - M phase, cell growth
- ___ 8. When during the cell cycle is a cell's DNA replicated?
- G₁ phase
 - G₂ phase
 - S phase
 - M phase

- ___ 9. Which event occurs during interphase?
- The cytoplasm divides.
 - Centrioles duplicate.
 - Spindle fibers begin to form.
 - Centromeres divide.
- ___ 10. Which of the following is a correct statement about the events of the cell cycle?
- Little happens during the G_1 and G_2 phases.
 - DNA replicates during cytokinesis.
 - The M phase is usually the longest phase.
 - Interphase consists of the G_1 , S, and G_2 phases.

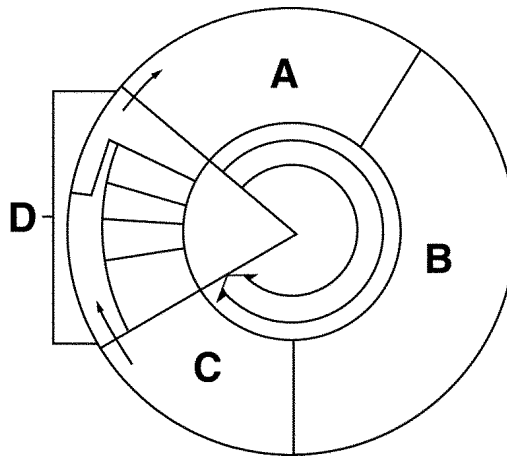


Figure 10–3

- ___ 11. Cell division is represented in Figure 10–3 by the letter
- A.
 - B.
 - C.
 - D.

Animal Cell

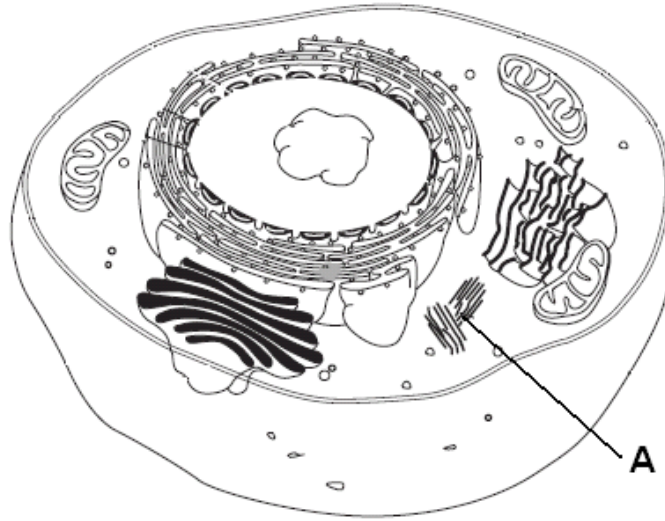


Figure 10-4

- ___ 12. In Figure 10-4, what role does structure A play in mitosis?
- replicate DNA
 - increase cell volume
 - connect to spindle fibers
 - dissolve nuclear envelope

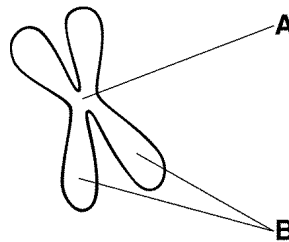


Figure 10-5

- ___ 13. The structure labeled A in Figure 10-5 is called the
- centromere.
 - centriole.
 - sister chromatid.
 - spindle.
- ___ 14. The structures labeled B in Figure 10-5 are called
- centromeres.
 - centrioles.
 - sister chromatids.
 - spindles.
- ___ 15. During which phase(s) of mitosis are structures like the one shown in Figure 10-5 visible?
- anaphase only
 - prophase, metaphase, and anaphase
 - metaphase only

d. anaphase and interphase

- ___ 16. Which of the following is a phase of mitosis?
- cytokinesis
 - interphase
 - prophase
 - S phase
- ___ 17. During which phase of mitosis do the chromosomes line up along the middle of the dividing cell?
- prophase
 - telophase
 - metaphase
 - anaphase
- ___ 18. Which of the following represents the phases of mitosis in their proper sequence?
- prophase, metaphase, anaphase, telophase
 - interphase, prophase, metaphase, anaphase, telophase
 - interphase, prophase, metaphase, telophase
 - prophase, anaphase, metaphase, telophase
- ___ 19. What is the role of the spindle fibers during mitosis?
- They help separate the chromosomes.
 - They break down the nuclear membrane.
 - They duplicate the DNA.
 - They make the chromosomes visible.
- ___ 20. The two main stages of cell division are called
- mitosis and interphase.
 - synthesis and cytokinesis.
 - the M phase and the S phase.
 - mitosis and cytokinesis.
- ___ 21. During normal mitotic cell division, a parent cell that has four chromosomes will produce two daughter cells, each containing
- two chromosomes.
 - four chromosomes.
 - eight chromosomes.
 - sixteen chromosomes.
- ___ 22. One difference between cell division in plant cells and in animal cells is that plant cells have
- centrioles.
 - centromeres.
 - a cell plate.
 - chromatin.
- ___ 23. Cancer is a disorder in which some cells have lost the ability to control their
- size.
 - spindle fibers.
 - growth rate.
 - surface area.
- ___ 24. Cancer cells form masses of cells called
- tumors.

- b. cyclins.
 - c. growth factors.
 - d. p53.
- _____ 25. A cell with a defective p53 gene is likely to
- a. stop responding to growth regulators.
 - b. stop dividing to produce daughter cells.
 - c. generate hormones that combat tumors.
 - d. produce cells without a defective p53 gene.
- _____ 26. Cancer affects
- a. humans only.
 - b. unicellular organisms only.
 - c. multicellular organisms only.
 - d. multicellular and unicellular organisms.
- _____ 27. Why are stem cells important?
- a. They have specialized DNA.
 - b. They are incapable of becoming cancer cells.
 - c. They have the potential to undergo cell division.
 - d. They have the potential to develop into other cell types.
- _____ 28. Griffith called the process he observed transformation because
- a. the mouse had been transformed.
 - b. the harmful bacteria had been transformed.
 - c. the harmless bacteria had been transformed.
 - d. the experiment had been transformed.
- _____ 29. What property of DNA does bacterial transformation illustrate?
- a. Bacterial DNA cannot move into other bacteria and function.
 - b. Bacterial DNA can move into another bacteria and function.
 - c. Bacterial DNA uses four nucleotides bases that work in pairs.
 - d. Bacterial DNA is found in a circular chromosome.
- _____ 30. Griffith's experiments advanced the study of genetics by proving that
- a. there is a chemical that contains genetic information that can be passed from one organism to another.
 - b. bacteria can make people sick by infecting them with a chemical that contains genetic information.
 - c. the bacteria that can make mice sick are the same bacteria that can be grown in culture dishes in a laboratory.
 - d. genetic information can be passed from parents to their offspring during sexual reproduction.
- _____ 31. What is inside a bacteriophage?
- a. protein
 - b. nucleic acid
 - c. lipid
 - d. carbohydrate
- _____ 32. What do bacteriophages infect?
- a. mice.
 - b. humans.

- c. viruses.
- d. bacteria.

- ___ 33. What stores information in a cell?
- a. proteins
 - b. carbohydrates
 - c. lipids
 - d. DNA
- ___ 34. What happens when a piece of DNA is missing?
- a. Genetic information is stored.
 - b. Genetic information is copied.
 - c. Genetic information is lost.
 - d. Genetic information is transmitted.

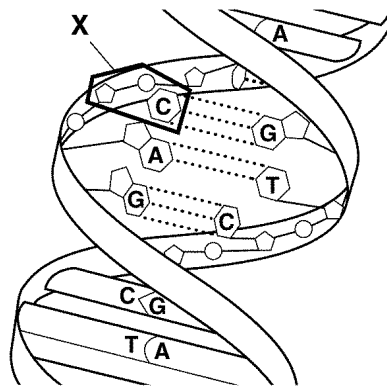


Figure 12–2

- ___ 35. Figure 12–2 shows the structure of
- a. a DNA molecule.
 - b. an amino acid.
 - c. a RNA molecule.
 - d. a protein.
- ___ 36. Which of the following is a nucleotide found in DNA?
- a. adenine + phosphate group + thymine
 - b. cytosine + phosphate group + guanine
 - c. deoxyribose + phosphate group + polymerase
 - d. deoxyribose + phosphate group + cytosine
- ___ 37. Because of base pairing in DNA, the percentage of
- a. adenine molecules in DNA is about equal to the percentage of guanine molecules.
 - b. thymine molecules in DNA is about equal to the percentage of adenine molecules
 - c. adenine molecules in DNA is much greater than the percentage of thymine molecules.
 - d. cytosine molecules in DNA is much greater than the percentage of guanine molecules.

Nitrogenous Bases (%)				
	A	G	T	C
Human		19.9	29.4	

Chicken	28.8			21.5
Bacterium (<i>S. lutea</i>)	13.4			

Figure 12–3

- ___ 38. The table in Figure 12–3 shows the results of measuring the percentages of the four bases in the DNA of several different organisms. Some of the values are missing from the table. Based on Chargaff’s rule, the percentages of guanine bases in chicken DNA should be around
- 28.8%
 - 19.9%
 - 21.5%
 - 13.4%
- ___ 39. Based on Chargaff’s rule, the percentage of cytosine in the DNA of the bacterium, *S. Lutea* in Figure 12–3, should be around
- 26.6%.
 - 73.2%.
 - 36.6%.
 - 29.4%.
- ___ 40. Rosalind Franklin contributed to the understanding of DNA by
- producing images of DNA molecules using X-rays.
 - figuring out that DNA strands form a double helix.
 - conducting experiments that showed which nucleotides are complementary.
 - finding that DNA was nucleic acid made up of a long chain of individual nucleotides.
- ___ 41. Which scientist(s) figured out that the shape of a DNA molecule is a double helix?
- Hershey and Chase
 - Griffith
 - Watson and Crick
 - Franklin
- ___ 42. What is the chronological order of the important discoveries in the structure of DNA?
- Franklin makes an X-ray diffraction photo of DNA → Chargaff’s ratios of nucleotides → Watson and Crick identify the double helix
 - Franklin makes an X-ray diffraction photo of DNA → Watson and Crick identify the double helix → Chargaff’s ratios of nucleotides
 - Chargaff’s ratios of nucleotides → Watson and Crick identify the double helix → Franklin makes an X-ray diffraction photo of DNA
 - Chargaff’s ratios of nucleotides → Franklin makes an X-ray diffraction photo of DNA → Watson and Crick identify the double helix

BASE	A	C	G	T
% of Total DNA	22	–	28	–

Figure 12–4

- ___ 43. What would happen to the percentage of G in Figure 12–4 if the percentage of A rose to 25%?

- a. G would drop to 19%
- b. G would drop to 25%
- c. G would rise to 29%
- d. G would rise to 32%

- ___ 44. Watson and Crick discovered the two strands in DNA
- a. run in perpendicular directions.
 - b. run in the same direction.
 - c. run in opposite directions.
 - d. run in random directions.
- ___ 45. DNA replication results in two DNA molecules,
- a. each with two new strands.
 - b. one with two new strands and the other with two original strands.
 - c. each with one new strand and one original strand.
 - d. each with two original strands.
- ___ 46. During DNA replication, a DNA strand that has the bases CTAGGT produces a strand with the bases
- a. TCGAAC.
 - b. GATCCA.
 - c. AGCTTG.
 - d. GAUCCA.
- ___ 47. Which of the following include all the others?
- a. DNA molecules
 - b. histones
 - c. chromosomes
 - d. nucleosomes

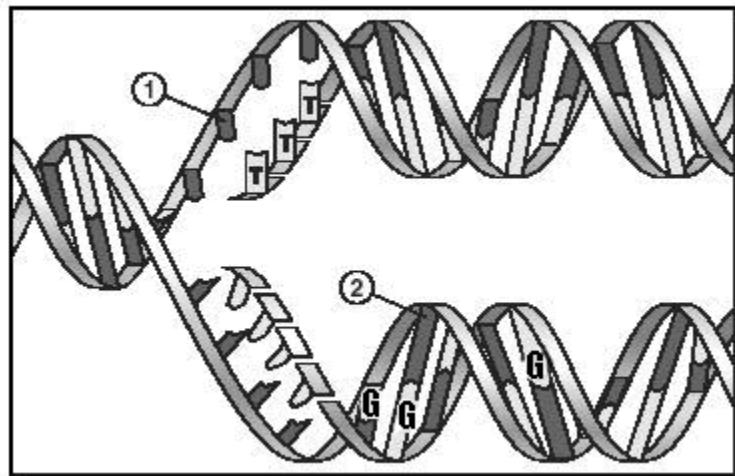


Figure 12-5

- ___ 48. In Figure 12-5, what nucleotide is going to be added at point 1, opposite from thymine?
- a. adenine
 - b. thymine
 - c. cytosine
 - d. guanine

- ___ 49. In Figure 12–5, what is adding base pairs to the strand?
- histones
 - nucleosomes
 - DNA polymerase
 - chromatin
- ___ 50. In eukaryotes, DNA
- is located in the nucleus.
 - floats freely in the cytoplasm.
 - is located in the ribosomes.
 - is circular.
- ___ 51. Which would be greater in a eukaryote than in a prokaryote?
- The percentage of guanine nucleotides.
 - The total number of base pairs in a chromosome.
 - The number of replication forks on a strand of DNA.
 - The total amount of DNA in a cell.
- ___ 52. In both prokaryotes and eukaryotes, how many copies of the chromosome are left after replication?
- 1
 - 2
 - 3
 - 4
- ___ 53. In both prokaryotes and eukaryotes, DNA replication happens
- before cell division.
 - in the nucleus.
 - only to telomeres.
 - around the histones.

DNA, DNA Replication and Mitosis Practice Test Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1 DIF: L3 REF: p. 276
OBJ: 10.1.1 Explain the problems that growth causes for cells. STA: SC.912.N.1.1.6
MSC: evaluation
2. ANS: A PTS: 1 DIF: L1 REF: p. 276
OBJ: 10.1.2 Compare asexual and sexual reproduction. STA: SC.912.L.16.17
TOP: Foundation Edition MSC: knowledge
3. ANS: C PTS: 1 DIF: L3 REF: p. 278
OBJ: 10.1.2 Compare asexual and sexual reproduction. STA: SC.912.L.16.17
MSC: evaluation
4. ANS: C PTS: 1 DIF: L3 REF: p. 280
OBJ: 10.2.1 Describe the role of chromosomes in cell division. STA: SC.912.L.14.3 MSC: analysis
5. ANS: C PTS: 1 DIF: L2 REF: p. 282
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: analysis
6. ANS: C PTS: 1 DIF: L1 REF: p. 282
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: knowledge
7. ANS: B PTS: 1 DIF: L2 REF: p. 281
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: analysis
8. ANS: C PTS: 1 DIF: L1 REF: p. 281
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: knowledge
9. ANS: B PTS: 1 DIF: L2 REF: p. 282
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
MSC: comprehension
10. ANS: D PTS: 1 DIF: L2 REF: p. 281
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: analysis
11. ANS: D PTS: 1 DIF: L1 REF: p. 281
OBJ: 10.2.2 Name the main events of the cell cycle. STA: SC.912.L.16.14
TOP: Foundation Edition MSC: knowledge
12. ANS: C PTS: 1 DIF: L2 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis. STA: SC.912.L.16.14 MSC: application
13. ANS: A PTS: 1 DIF: L1 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis. STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: knowledge
14. ANS: C PTS: 1 DIF: L1 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis. STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: knowledge

15. ANS: B PTS: 1 DIF: L2 REF: p. 282 | p. 283
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: analysis
16. ANS: C PTS: 1 DIF: L1 REF: p. 282 | p. 283
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: knowledge
17. ANS: C PTS: 1 DIF: L2 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: comprehension
18. ANS: A PTS: 1 DIF: L2 REF: p. 282 | p. 283
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: analysis
19. ANS: A PTS: 1 DIF: L2 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 MSC: application
20. ANS: D PTS: 1 DIF: L1 REF: p. 282
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: knowledge
21. ANS: B PTS: 1 DIF: L3 REF: p. 279 | p. 280
OBJ: 10.2.3 Describe what happens during the four phases of mitosis.
STA: SC.912.L.16.14 TOP: Foundation Edition
MSC: application
22. ANS: C PTS: 1 DIF: L3 REF: p. 284
OBJ: 10.2.4 Describe the process of cytokinesis. STA: SC.912.L.14.3 | SC.912.L.16.14
TOP: Foundation Edition MSC: synthesis
23. ANS: C PTS: 1 DIF: L1 REF: p. 289
OBJ: 10.3.2 Explain how cancer cells are different from other cells.
STA: SC.912.N.1.1.6 | SC.912.L.16.8 TOP: Foundation Edition
MSC: comprehension
24. ANS: A PTS: 1 DIF: L1 REF: p. 289
OBJ: 10.3.2 Explain how cancer cells are different from other cells.
STA: SC.912.N.1.1.6 | SC.912.L.16.8 TOP: Foundation Edition
MSC: knowledge
25. ANS: A PTS: 1 DIF: L3 REF: p. 289
OBJ: 10.3.2 Explain how cancer cells are different from other cells.
STA: SC.912.N.1.1.6 | SC.912.L.16.8 MSC: evaluation
26. ANS: C PTS: 1 DIF: L3 REF: p. 289
OBJ: 10.3.2 Explain how cancer cells are different from other cells.
STA: SC.912.N.1.1.6 | SC.912.L.16.8 MSC: synthesis
27. ANS: D PTS: 1 DIF: L2 REF: p. 295
OBJ: 10.4.2 Define stem cells and explain their importance. TOP: Foundation Edition
MSC: comprehension
28. ANS: C PTS: 1 DIF: L2 REF: p. 339
OBJ: 12.1.1 Summarize the process of bacterial transformation.

- STA: SC.912.L.16.7 TOP: Foundation Edition
MSC: comprehension
29. ANS: B PTS: 1 DIF: L3 REF: p. 340 | p. 341
OBJ: 12.1.1 Summarize the process of bacterial transformation.
STA: SC.912.L.16.7 TOP: Foundation Edition
MSC: evaluation
30. ANS: A PTS: 1 DIF: L2 REF: p. 338 | p. 339
OBJ: 12.1.1 Summarize the process of bacterial transformation.
STA: SC.912.L.16.7 TOP: Foundation Edition
MSC: comprehension
31. ANS: B PTS: 1 DIF: L1 REF: p. 340 | p. 341
OBJ: 12.1.2 Describe the role of bacteriophages in identifying genetic material.
STA: SC.912.L.16.7 TOP: Foundation Edition
MSC: comprehension
32. ANS: D PTS: 1 DIF: L1 REF: p. 340
OBJ: 12.1.2 Describe the role of bacteriophages in identifying genetic material.
STA: SC.912.L.16.7 TOP: Foundation Edition
MSC: knowledge
33. ANS: D PTS: 1 DIF: L1 REF: p. 342
OBJ: 12.1.3 Identify the role of DNA in heredity. STA: SC.912.L.16.3
TOP: Foundation Edition MSC: knowledge
34. ANS: C PTS: 1 DIF: L1 REF: p. 343
OBJ: 12.1.3 Identify the role of DNA in heredity. STA: SC.912.L.16.3
TOP: Foundation Edition MSC: comprehension
35. ANS: A PTS: 1 DIF: L1 REF: p. 344 | p. 345
OBJ: 12.2.1 Identify the chemical components of DNA. STA: SC.912.L.18.4
TOP: Foundation Edition MSC: knowledge
36. ANS: D PTS: 1 DIF: L2 REF: p. 345
OBJ: 12.2.1 Identify the chemical components of DNA. STA: SC.912.L.18.4
TOP: Foundation Edition MSC: analysis
37. ANS: B PTS: 1 DIF: L2 REF: p. 345
OBJ: 12.2.1 Identify the chemical components of DNA. STA: SC.912.L.18.4
TOP: Foundation Edition MSC: analysis
38. ANS: C PTS: 1 DIF: L2 REF: p. 345
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code. STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: application
39. ANS: C PTS: 1 DIF: L3 REF: p. 345
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code. STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: analysis
40. ANS: A PTS: 1 DIF: L2 REF: p. 346
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code. STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: comprehension
41. ANS: C PTS: 1 DIF: L2 REF: p. 346
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code. STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: comprehension

42. ANS: D PTS: 1 DIF: L3 REF: p. 345 | p. 346 | p. 347
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code.
STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: analysis
43. ANS: B PTS: 1 DIF: L3 REF: p. 345
OBJ: 12.2.2 Discuss the experiments leading to the identification of DNA as the molecule that carries the genetic code.
STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: evaluation
44. ANS: C PTS: 1 DIF: L1 REF: p. 347
OBJ: 12.2.3 Describe the steps leading to the development of the double-helix model of DNA.
STA: SC.912.N.3.2 | SC.912.L.18.4 TOP: Foundation Edition
MSC: comprehension
45. ANS: C PTS: 1 DIF: L2 REF: p. 338 | p. 339
OBJ: 12.3.1 Summarize the events of DNA replication.
STA: SC.912.L.16.3 | SC.912.L.18.4
MSC: application
46. ANS: B PTS: 1 DIF: L1 REF: p. 338 | p. 339
OBJ: 12.3.1 Summarize the events of DNA replication.
TOP: Foundation Edition MSC: application
STA: SC.912.L.16.3 | SC.912.L.18.4
47. ANS: C PTS: 1 DIF: L3 REF: p. 352
OBJ: 12.3.2 Compare DNA replication in prokaryotes with that of eukaryotes.
STA: SC.912.L.14.3 | SC.912.L.16.3 MSC: synthesis
48. ANS: A PTS: 1 DIF: L2 REF: p. 350 | p. 351
OBJ: 12.3.1 Summarize the events of DNA replication.
TOP: Foundation Edition MSC: analysis
STA: SC.912.L.16.3 | SC.912.L.18.4
49. ANS: C PTS: 1 DIF: L1 REF: p. 351
OBJ: 12.3.1 Summarize the events of DNA replication.
MSC: analysis
STA: SC.912.L.16.3 | SC.912.L.18.4
50. ANS: A PTS: 1 DIF: L1 REF: p. 352
OBJ: 12.3.2 Compare DNA replication in prokaryotes with that of eukaryotes.
STA: SC.912.L.14.3 | SC.912.L.16.3 TOP: Foundation Edition
MSC: knowledge
51. ANS: C PTS: 1 DIF: L2 REF: p. 352 | p. 353
OBJ: 12.3.2 Compare DNA replication in prokaryotes with that of eukaryotes.
STA: SC.912.L.14.3 | SC.912.L.16.3 TOP: Foundation Edition
MSC: analysis
52. ANS: B PTS: 1 DIF: L1 REF: p. 353
OBJ: 12.3.2 Compare DNA replication in prokaryotes with that of eukaryotes.
STA: SC.912.L.14.3 | SC.912.L.16.3 TOP: Foundation Edition
MSC: comprehension
53. ANS: A PTS: 1 DIF: L2 REF: p. 352 | p. 353
OBJ: 12.3.2 Compare DNA replication in prokaryotes with that of eukaryotes.
STA: SC.912.L.14.3 | SC.912.L.16.3 TOP: Foundation Edition
MSC: comprehension